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NATIONAL DAM SAFETY PROGRAM. DIXONS POND DAM NJ (00175), PASSAI--ETC(U)

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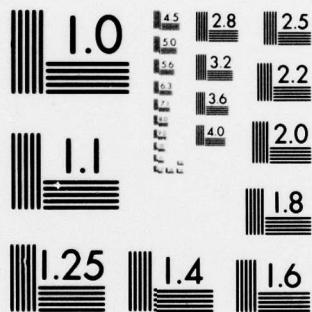
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DIXONS POND DAM^E

NJ 00175

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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DEPARTMENT OF THE ARMY

Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's ade- quacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		

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NAPEN-D

12 SEP 1979

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Dixons Pond Dam in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Dixons Pond Dam, a high hazard potential structure, is judged to be in poor overall condition. The dam's spillway is considered inadequate since 11 percent of the Spillway Design Flood--SDF - would overtop the dam. (The SDF, in this instance, is one half of the Probable Maximum Flood.) The decision to consider the spillway "inadequate" instead of "seriously inadequate" is based on the determination that dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

79 09 24 042

OPEN-D

Honorable Brendan T. Bryne

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to:

(1) Design and supervise procedures for repair of the dry-stone-masonry retaining wall on the downstream side of the embankment between the spillway and the northeast abutment.

(2) Investigate the seepage at the downstream toe, and design and implement appropriate remedial measures.

(3) Design and construct repairs to the deteriorated concrete.

(4) Design and implement remedial measures needed to restore the deteriorated low level outlet including necessary operating mechanisms.

Any remedial measures found necessary should be initiated within calendar year 1980.

c. Within thirty days from the date of approval of this report the owner should set up a procedure to check the condition of the dam periodically and monitor the seepage until remedial measures are effected.

d. Within three months from the date of approval of this report the owner should remove debris from the crest of the dam and the downstream channel area.

e. Within six months from the date of approval of this report the owner should clear trees and brush on either side of the downstream channel for some distance downstream of the dam to allow identification of seepage or stability problems.

f. Within one year from the date of approval of this report the owner should engage a professional engineer qualified in the design and construction of dams to make a comprehensive technical inspection of the dam once every two years.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman James A. Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

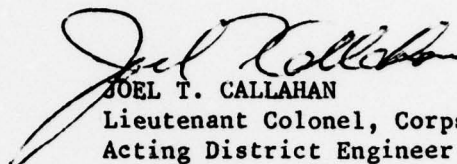
Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

AN-D
Honorable Brendan T. Byrne

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

1 Incl
As stated


JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

Copies furnished:
Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

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Trenton, NJ 08625

DIXONS POND DAM (NJ00175)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 15 May 1979, by Anderson-Nichols & Co., Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Dixons Pond Dam, a high hazard potential structure, is judged to be in poor overall condition. The dam's spillway is considered inadequate since 11 percent of the Spillway Design Flood--SDF - would overtop the dam. (The SDF, in this instance, is one half of the Probable Maximum Flood.) The decision to consider the spillway "inadequate" instead of "seriously inadequate" is based on the determination that dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to:

(1) Design and supervise procedures for repair of the dry-stone-masonry retaining wall on the downstream side of the embankment between the spillway and the northeast abutment.

(2) Investigate the seepage at the downstream toe, and design and implement appropriate remedial measures.

(3) Design and construct repairs to the deteriorated concrete.

(4) Design and implement remedial measures needed to restore the deteriorated low level outlet including necessary operating mechanisms.

Any remedial measures found necessary should be initiated within calendar year 1980.

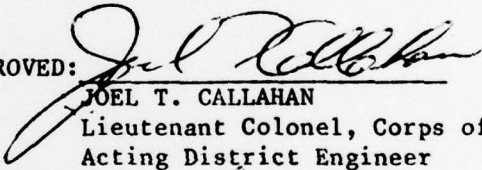
c. Within thirty days from the date of approval of this report the owner should set up a procedure to check the condition of the dam periodically and monitor the seepage until remedial measures are effected.

d. Within three months from the date of approval of this report the owner should remove debris from the crest of the dam and the downstream channel area.

e. Within six months from the date of approval of this report the owner should clear trees and brush on either side of the downstream channel for some distance downstream of the dam to allow identification of seepage or stability problems.

f. Within one year from the date of approval of this report the owner should engage a professional engineer qualified in the design and construction of dams to make a comprehensive technical inspection of the dam once every two years.

APPROVED:


JOEL T. CALLAHAN

Lieutenant Colonel, Corps of Engineers
Acting District Engineer

DATE:

11 Sep 79

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Dixons Pond Dam
ID Number: FED ID No. NJ 00175
State Located: New Jersey
County Located: Morris
Stream: Rockaway River
River Basin: Passaic
Date of Inspection: May 15, 1979

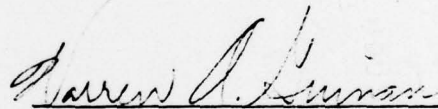
ASSESSMENT OF GENERAL CONDITIONS


Dixons Pond Dam is 150 years old and in poor overall condition. It is small in size and is classified as high hazard. A clear seepage of 10 gpm was noted at the toe of the dam between the spillway and northeast abutment. The dry-stone masonry wall on the downstream side of the embankment between the spillway and northeast abutment is in poor condition with a pronounced bulge of about 1 foot. The downstream channel contains debris, and trees and brush overhang the channel. A derelict boat is lodged on the crest of the spillway. The concrete walls, piers, and caps of the access foot bridge and spillway are eroded and spalled where exposed to weather and water. The low level outlet pipe is badly deteriorated and neither a valve nor gate operating mechanism could be found. The spillway can pass less than 5% of the PMF and is inadequate.

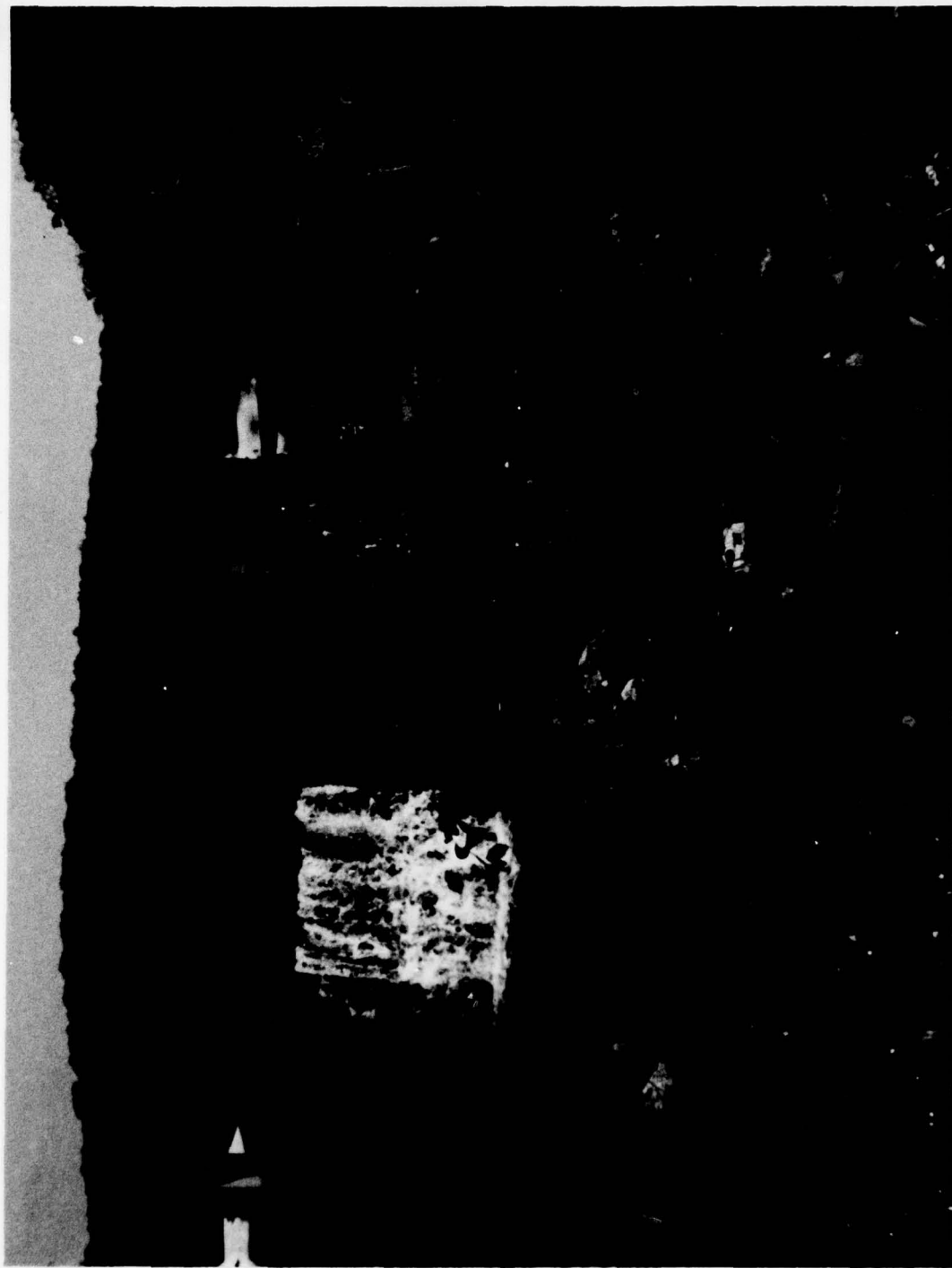
We recommend that the owner retain the services of a professional engineer, qualified in the design and inspection of dams, to accomplish the following in the near future: further evaluate the hydrology and hydraulics of the watershed, dam, and reservoir, and design and implement appropriate mitigating measures to insure adequate discharge capacity; repair the dry-stone masonry retaining wall on the downstream side of the dam between the spillway and northeast abutment; investigate the seepage at the downstream toe and design and implement appropriate remedial measures;

design and implement repairs to the deteriorated concrete; and design and implement remedial measures needed to restore the deteriorated low level outlet to an operable condition.

We further recommend that as a part of operating and maintenance procedures, the owner check the condition of the dam periodically and monitor the seepage at the downstream toe until remedial measures are effected. This should be started immediately. Debris should be removed soon from the crest of the dam and the downstream channel area. Trees and brush should be cleared in the near future from either side of the downstream channel for some distance downstream of the dam to allow identification of seepage or stability problems should they occur. A professional engineer qualified in the design and inspection of dams should be engaged in the future to make a comprehensive technical inspection of the dam once every two years. A surveillance program should be established in the near future for use during and immediately following periods of heavy rainfall and also a warning program to follow in case of floodflow conditions or imminent dam failure.


Warren A. Guinan, P.E.
Project Manager
New Jersey No. 16848

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15 MAY 1979

OVERVIEW
DIXONS POND DAM

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DIXONS POND DAM N.J. NO. 25- 82 FED ID NO. NJ00175

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY INSPECTION PROGRAM
DIXONS POND DAM
U.S. #NJ00175 N.J. #25-82

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Authority to perform the Phase I Safety Inspection of Dixons Pond Dam was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 4 April 1979 under Contract No. FPM-39 dated 28 June 1978. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367 and by agreement between the State and the U.S. Army Engineers District, Philadelphia. The inspection discussed herein was performed by Anderson-Nichols & Company, Inc. on 15 May 1979.

b. Purpose. The purpose of the Phase I Investigation is to develop an assessment of the general conditions with respect to the safety of Dixons Pond Dam and appurtenances based upon available data and visual inspection, and determine any need for emergency measures and conclude if additional studies, investigations, and analyses are necessary and warranted.

1.2 Project Description

a. Description of Dam and Appurtenances. Dixons Pond Dam is a 9-foot high, 150-foot long earthfill dam, built around 1830. The downstream face is of dry-stone-masonry with a 1 horizontal to 4 vertical slope. The 72-foot free overflow spillway is near the center of the dam. The crest of the spillway is capped by an 8-inch thick concrete slab. A service bridge constructed of steel channels with wooden deck and railing is set on two concrete piers and spans the spillway, about 6 inches upstream of the crest. A dirt path extends along the crest from each end of the service bridge. A 20-inch diameter steel, low level outlet pipe is located about 12 feet to the left of the spillway and 3 feet above the embankment toe. Essential features of the dam are given in Figure 2.

b. Location. The dam is located in Morris County, New Jersey on a tributary to Stony Brook, a tributary to the Rockaway River, approximately 1 mile northwest of Powerville. It is at north latitude 40° 56.0' and west longitude 74° 26.5'. A location map is given in Figure 1.

c. Size Classification. Dixons Pond Dam is classified as being "small" on the basis of storage at the dam crest of 287 acre-feet, which is less than 1000 acre-feet but more than 50 acre-feet, and on the basis of its height of 9 feet, which is less than 40 feet, in accordance with criteria given in the Recommended Guidelines for Safety Inspections of Dams.

d. Hazard Classification. Visual inspection of the downstream area shows that failure of Dixons Pond Dam could possibly cause damages to 3 residences. It is estimated that the affected structures could be inundated by less than 7 feet of water and that loss of a few lives is possible. Accordingly, Dixons Pond Dam is classified as High Hazard.

e. Ownership. The dam is owned by Dixon Associates, Boonton Township, New Jersey. Mr. Bruce Dixon, Rockaway Valley Road, Rockaway Valley, Boonton, N. J., was contacted for information.

f. Purpose of Dam. The lake is used for recreation. Originally the dam was built and operated to supply water power for a forge.

g. Design and Construction History. Little information was disclosed regarding the design and construction of the original dam. The service bridge was added in 1939.

h. Normal Operational Procedures. No current operating procedures were disclosed.

1.3 Pertinent Data

a. Drainage Area

Watershed 2.9 square miles

Normal water surface 29 acres

b. Discharge at Damsite (cfs)

Maximum flood at damsite - unknown

Ungated (total) spillway capacity at maximum pool elevation - 459

Low level outlet (if operable) - 24

c. Elevation. (ft. above MSL)

Top of dam - 551.6 (low point in crest)
551.9 (abutments)

Recreation pool - 550

Spillway crest - 550

Streambed at centerline of dam - 541.9 (downstream)
549.5 (upstream)

Maximum tailwater (estimated) - 549

d. Reservoir. (feet)

Length of maximum pool - 3600

Length of recreation pool - 3100

e. Storage. (acre-feet)

Recreation pool - 235

Design surcharge - 523

Top of dam - 287

f. Reservoir Surface (acres)

Top of dam - 30

Maximum pool - 30

Recreation pool - 29.4

Spillway crest - 29.4

g. Dam

Type - earthfill and stone masonry

Length - 150 ft.

Height - 9 ft.

Top Width - 10 ft.

Side Slopes - upstream 1H:1V; downstream 1H:4V

Zoning - Masonry upstream and downstream faces
with earthfill core

Impervious core - unknown

Cutoff - unknown

Grout curtain - unknown

h. Spillway.

Type - free overflow concrete capped stone masonry

Length of weir - 70 feet

Crest elevation - 550 feet msl

Gates - none

Upstream channel - Dixons Pond (no approach channel)

Downstream channel - tributary to Stony Brook

i. Regulating Outlets.

Type - one 20-inch diameter steel low level
outlet pipe.

Length (estimated) - 30'

Access - not visible

Regulating facilities - not visible

SECTION 2 ENGINEERING DATA

2.1 Design

No plans, hydraulic or hydrologic data for Dixons Pond were disclosed.

2.2 Construction

No recorded data concerning construction of Dixons Pond Dam were disclosed. Reference data on file with the New Jersey Department of Environmental Protection indicates that the dam was built in 1830 by James Dixon. The date on the service bridge abutment indicates that it was added to the structure in 1939.

2.3 Operation

No engineering operational data were disclosed.

2.4 Evaluation

a. Availability. A search of the New Jersey Department of Environmental Protection files, contact with community officials and contact with the owner revealed only a limited amount of recorded information. All disclosed information was retrieved.

b. Adequacy. Because of the limited amount of recorded data available, evaluation of this dam was based solely on visual observations.

c. Validity. Parts of the recorded data retrieved were found to be incorrect based on visual observations.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. Dam. Water is discharging at an estimated rate of 10 gpm from the toe of the embankment section of the dam, between the spillway and the northeast abutment. There is a major bulge and several displaced blocks of rock in the dry-stone-masonry wall which constitutes the lower part of the downstream slope of the embankment section between the spillway and the northeast abutment.

b. Appurtenant Structures. The concrete wall in the southwest embankment is badly cracked and deteriorated with at least 5 major vertical cracks and joints. Considerable spalling has occurred at the cracks and joints. The bridge abutments and center pier of the service bridge across the spillway show considerable erosion and undermining of the concrete below the water surface. The steel channel bridge beams were observed to be in good condition. Numerous pieces of plank decking were observed to be deteriorated. Two planks are missing. The remainder of the planks are weathered.

The downstream end of the 20" low level outlet located on the northeast embankment is badly deteriorated and rusted. Water was discharging at an estimated rate of 10 gpm from the end of pipe. The upstream end was not visible.

The surface of the concrete cap on the spillway has eroded exposing the coarse aggregate. The transverse joints have also eroded.

One concrete cap section is approximately 1 1/2" lower than the adjacent section. It could not be determined from the visual inspection whether this section was constructed in that manner or whether it had settled. A derelict boat is lodged on the spillway between the crest and the service bridge.

c. Reservoir Area. The watershed above the dam is gently to steeply sloping and heavily wooded. Slopes adjacent to the reservoir appeared stable.

d. Downstream Channel. Trees and brush are growing on the banks of the downstream channel and there are two barrels and several pieces of lumber in the channel near the dam.

SECTION 4 OPERATIONAL PROCEDURES

4.1 Procedures

No formal operating procedures were disclosed. With the dam and appurtenant structures in their present condition little operation is possible.

4.2 Maintenance of Dam

No formal maintenance procedures for the dam were disclosed. From the condition of the dam, it is apparent that a regular maintenance program has not been followed.

4.3 Maintenance of Operating Facilities

No formal maintenance procedures for the operating facilities were disclosed. From the condition of the appurtenant structures, it is apparent that a regular maintenance program has not been followed.

4.4 Warning System

No description of any warning system was disclosed.

4.5 Evaluation of Operational Adequacy

Because of the lack of operation and maintenance procedures, the remedial measures described in Section 7.2 c. should be implemented as prescribed.

SECTION 5
HYDROLOGIC/HYDRAULIC

5.1 Evaluation of Features

a. Design Data. Since no data were disclosed an evaluation could not be performed.

b. Experience Data. Reference data from New Jersey Department of Environmental Protection files indicate that during a July 1931 inspection, the owner stated that the earth section of the dam had been overtopped by a few inches twice in the preceding 40 years. No other experience data were disclosed.

c. Visual Observations. No visual evidence of damage to the structure caused by overtopping was found. Debris, such as the derelict boat, may partially obstruct the spillway opening and cause serious reduction in the capacity during a flood occurrence. At the time of inspection, less than 1-inch of water was passing over the spillway crest. The low level outlet was leaking.

d. Overtopping Potential. The hydraulic/hydrologic evaluation for Dixons Pond Dam is based on a spillway design flood (SDF) equal to one-half the probable maximum flood (PMF) in accordance with the range of floods given in the evaluation guidelines for dams classified as high hazard and small in size. The PMF has been determined by application of the SCS dimensionless unit hydrograph procedure to a 24-hour PMP storm of 22.5 inches. Hydrologic computations are given in Appendix 3. The routed half-PMF peak discharge for the subject watershed is 5,484 cfs.

The minimum elevation of the dam allows 1.55 feet of depth in the spillway before overtopping occurs. Under this head the spillway capacity is 459 cfs, which is less than the required SDF.

Flood routing calculations indicate that Dixons Pond Dam will be overtopped for more than 7 hours to a maximum depth of 3.3 feet under half-PMF conditions. It is estimated that the spillway can pass less than 5 percent of the PMF without overtopping the dam, thus the spillway is considered inadequate.

Because the dam is classified as High Hazard and the spillway cannot pass 50 percent of the PMF, the increase in downstream hazard because of overtopping failure was assessed. The dam failure analysis and downstream routing indicate that the probability of loss of life is not significantly increased due to dam failure.

e. Drawdown Capability. Assuming that the low level outlet currently in place can be restored to an operable condition, it is estimated that the pond can be drained in approximately 16 days, assuming no significant inflow. This time period is considered marginal for draining the reservoir in an emergency situation.

SECTION 6 STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. There was no visual evidence of past instability or potential future instability of the dry-stone masonry spillway section of the dam. Seepage at the downstream toe and the poor condition of the dry masonry retaining wall on the downstream face of the embankment section between the spillway and the northeast abutment indicate that future instability of that section may develop. Based on the visual inspection alone it is not possible to determine the character of the dam foundation or the interior of the cross section, or the shape of the upstream face below the level of the sediment in the reservoir against the dam. Therefore, it is not possible to evaluate the factor of safety of the dam against slope failure, sliding, or overturning.

b. Design and Construction Data. No design or construction data pertinent to the structural stability of the dam were disclosed.

c. Operating Records. No operating records pertinent to the structural stability of the dam were disclosed.

d. Post Construction Changes. The visual inspection disclosed a mark in the concrete bridge pier dated 1939 indicating that the spillway cap and service bridge were added at that time. No other records pertinent to post construction changes were disclosed.

e. Seismic Stability. Dixons Pond Dam is located in Seismic Zone 1 and in accordance with the recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Dixons Pond Dam is 150 years old and in poor overall condition.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based primarily on the visual inspection.

c. Urgency. The recommendations made in Section 7.2 a and the operating and maintenance procedures in 7.2 c should be implemented by the owner as prescribed, after receipt of this Phase I report.

d. Necessity for Additional Data/Evaluation. The information available from the visual inspection is adequate to identify the potential problems which are listed in 7.2 a below. These problems require the attention of a professional engineer who will have to make additional engineering studies to design or specify remedial measures to rectify the problems. If left unattended, the problems could lead to instability of the structure.

7.2 Recommendations/Remedial Measures

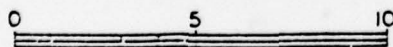
a. Recommendations. The owner should retain the services of a professional engineer qualified in the design and inspection of dams to accomplish the following in the near future:

1. Further evaluate the hydrology and hydraulics of the watershed, dam, and reservoir, and design appropriate mitigating measures to insure adequate discharge capacity.
2. Design and supervise procedures for repair of the dry-stone-masonry retaining wall on the downstream side of the embankment between the spillway and the northeast abutment.
3. Investigate the seepage at the downstream toe, and design and implement appropriate remedial measures.

4. Design and construct repairs to the deteriorated concrete.
 5. Design and implement remedial measures needed to restore the deteriorated low level outlet including necessary operating mechanisms.
- b. Alternatives. Drain the pond and breach the dam.
- c. Operating and Maintenance Procedures.
- The owner should:
1. Check the condition of the dam periodically and monitor the seepage until remedial measures are effected. This should be started immediately.
 2. Remove debris from the crest of the dam and the downstream channel area. This should be done soon.
 3. Clear trees and brush on either side of the downstream channel for some distance downstream of the dam to allow identification of seepage or stability problems. This should be done in the near future.
 4. Engage a professional engineer qualified in the design and construction of dams to make a comprehensive technical inspection of the dam once every two years. This should be started in the future.
 5. Establish a surveillance program for use during and immediately following periods of heavy rainfall, and also a warning program to follow in case of floodflow conditions or imminent dam failure. This should be done in the near future.



SCALE IN MILES



MAP BASED ON STATE OF NEW JERSEY
OFFICIAL HIGHWAY MAP AND GUIDE.

Anderson-Nichols & Co., Inc.		U.S. ARMY ENGINEER DIST. PHILADELPHIA	
BOSTON		CORPS OF ENGINEERS	
MASSACHUSETTS		PHILADELPHIA, PA.	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
DIXONS POND DAM			
LOCATION MAP			
DIXONS POND		NEW JERSEY	
		SCALE: SEE BAR SCALE	
		DATE: JUNE, 1979	

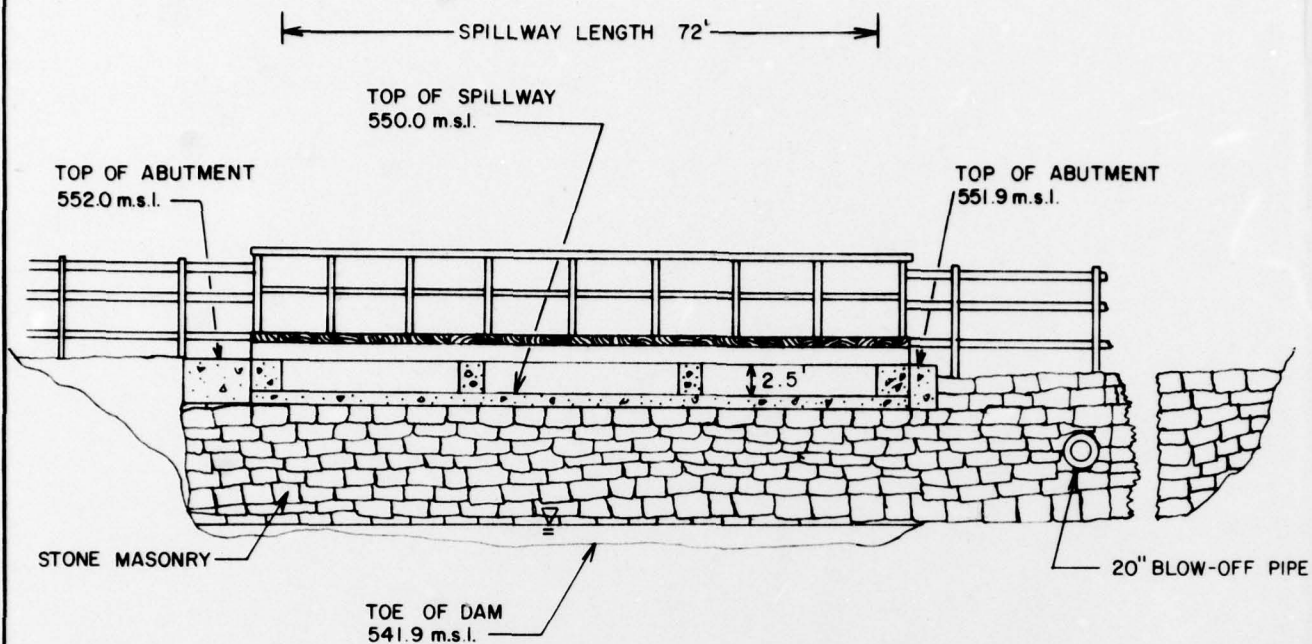
FIGURE 1

APPENDIX 1

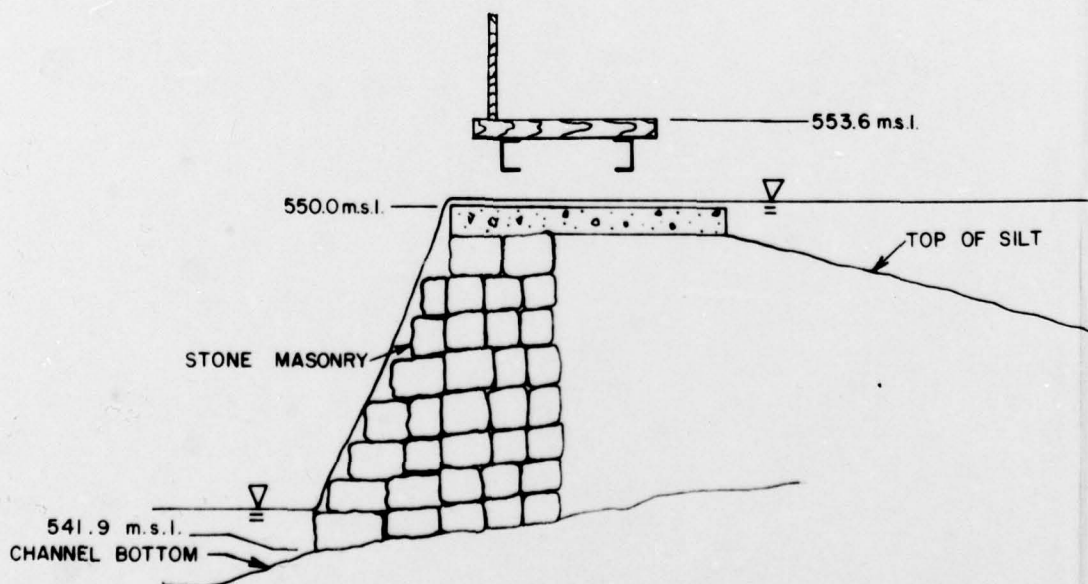
CHECK LIST

VISUAL INSPECTION

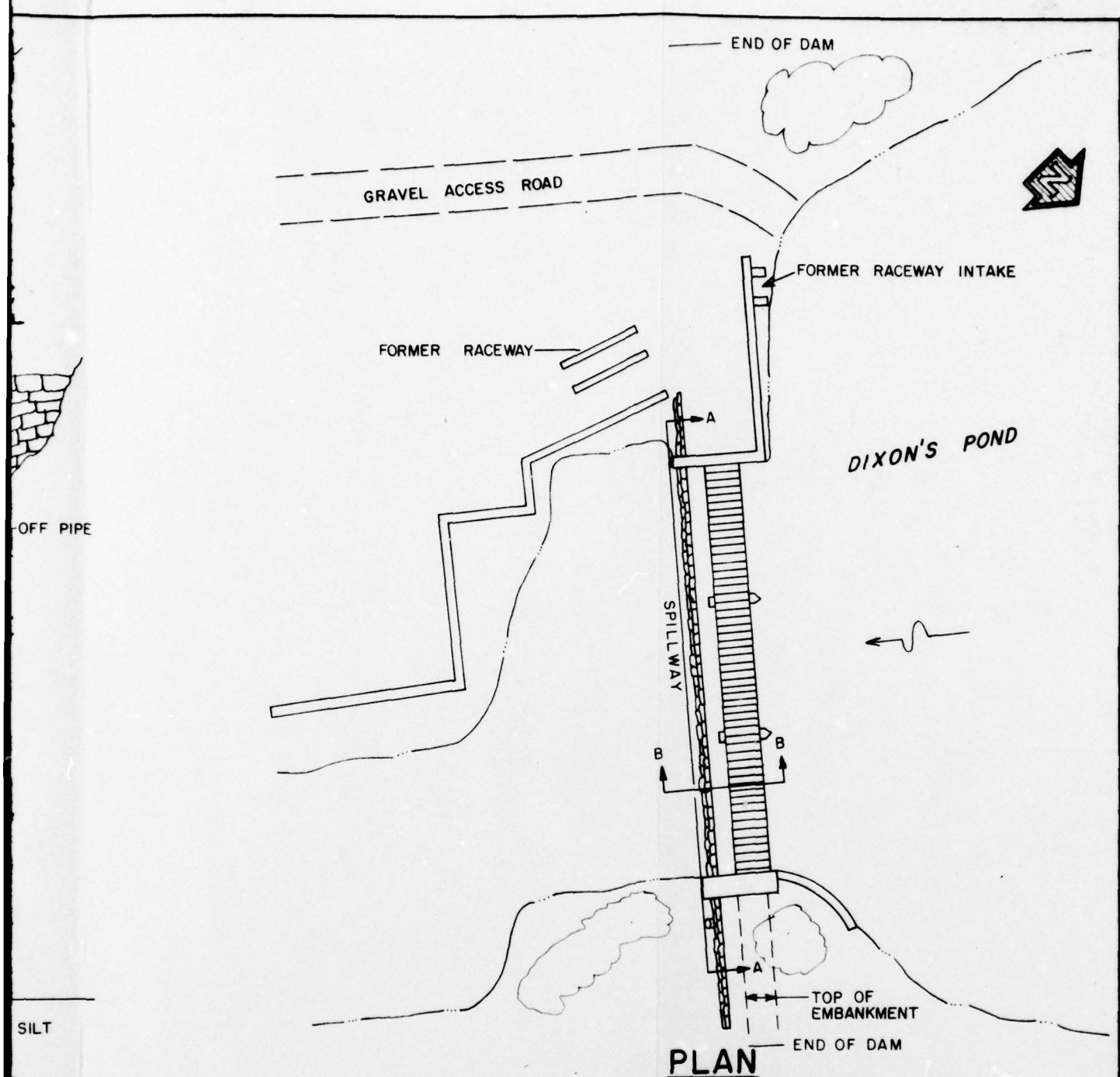
DIXONS POND DAM



SPILLWAY ELEVATION A-A



SPILLWAY ELEVATION B-B



PLAN

DATA FROM FIELD INSPECTION MAY 15, 1979

Anderson - Nichols & Co., Inc. BOSTON MASSACHUSETTS		U.S. ARMY ENGINEER DIST. PHILADELPHIA CORPS OF ENGINEERS PHILADELPHIA, PA	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
DIXON'S POND DAM			
DIXON'S POND		NEW JERSEY	
		SCALE: NOT TO SCALE	
		DATE: JUNE, 1979	

FIGURE 2

Check List
Visual Inspection
Phase 1

Name Dam Dixons Pond Dam County Morris State New Jersey Coordinators NJDEP
Date(s) Inspection 5/15/79 Weather Sunny, cool Temperature 60° F
Pool Elevation at Time of Inspection 550.1 MSL Tailwater at Time of Inspection 541.9 MSL

Inspection Personnel:

Warren Guinan

Stephen Gilman

David Deane

Ronald Hirschfeld

Gilman & Hirschfeld Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEE PAGE ON LEAKAGE	Not observable	Water discharging over crest of masonry section obscures downstream face.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	No indication of distress or movement.	
DRAINS	None observed	
WATER PASSAGES	Not observable	
FOUNDATION	Not observable	Water discharging over crest of masonry section obscures downstream face.

CONCRETE/MASONRY DAMS

Concrete Training Walls and Abutments to Spillway.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Right abutment and training wall - 5 major vertical cracks/joints. Concrete wall backed with earthfill. Stone masonry downstream. Numerous surface cracks and extensive spalling and erosion in vicinity of vertical cracks/joints. Length of wall, 45'. Left abutment and training wall - surface erosion and minor surface cracking. Extensive surface spalling and erosion at water surface.	
STRUCTURAL CRACKING	Right - appears to be at least 3 structural cracks in 10" thick wall. Left - 1 vertical crack at upstream face of bridge abutment.	Deteriorated concrete should be repaired.
VERTICAL AND HORIZONTAL ALIGNMENT	Right - Little evidence of horizontal or vertical movement. Left - $\frac{1}{4}$ " vertical movement at construction joint and $1\frac{1}{2}$ " horizontal separation.	
MONOLITH JOINTS	Not applicable	
CONSTRUCTION JOINTS	Right - upstream abutment face - joints in poor condition. All indicate some movement. Extensive spalling and erosion at joints. Left - One vertical construction joint near center of curved wall (See alignment above). Wall on right side, downstream of dam - Old concrete wall, purpose unknown, badly deteriorated. Tipped and cracked. Does not appear to be a structural element of dam.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Major bulge and several displaced blocks of rock in downstream dry-stone-masonry face between left abutment and left end of spillway.	Downstream dry-stone-masonry face between left abutment and left end of spillway should be repaired.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Good	
RIPRAP FAILURES	None	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RAILINGS	Right - wood post and rail fencing on downstream face, weathered condition, no paint.	Fence should be repaired and painted.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No indication of distress or movement.	
ANY NOTICEABLE SEEPAGE	Wet areas downstream of stone masonry and earth sections between spillway and left abutment and between spillway and right abutment. Both areas covered with leaves and decaying vegetation. No visible evidence of discharging water at downstream toe near right end. Small discharge water near left end.	Seepage control measures should be designed and implemented.
STAFF GAGE AND RECORDER	None observed.	
DRAINS	None observed.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not applicable	
INTAKE STRUCTURE	Not visible due to water in reservoir. No evidence of gate operating mechanisms.	Upstream gate should be repaired and placed into operable condition.
OUTLET PIPE	20" riveted steel pipe. Bottom rusted out. Badly deteriorated. Flow of approximately 20 gpm probably due to leaking valve.	Repair corroded pipe. Holes in pipe could cause erosion of embankment.
OUTLET CHANNEL	Bottom of channel covered with boulders. Some brush growing in channel. Many trees overhanging channel.	Brush and trees should be cleared 25 feet on both sides of channel for a distance of 100 feet downstream from the dam.
EMERGENCY GATE	None observed	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR - stone masonry with concrete cap. Tip nearly flat.	Concrete cap surface eroded. Coarse aggregate exposed. Transverse construction joints eroded. One section approximately 8' long settled 1 1/4". Crest has eroded. Concrete cap approximately 8" thick by 6'6" wide.	Date on abutment indicates work was done in 1939. Concrete should be repaired to prevent further deterioration
APPROACH CHANNEL	Wide and unobstructed. Bottom covered with sediment to level of upstream edge of spillway crest.	
DISCHARGE CHANNEL	Bottom of channel covered with boulders. Some brush growing in channel. Trees overhanging channel.	Brush and trees should be cleared 25 feet on both sides of channel for a distance of 100 feet downstream from the dam.
BRIDGE AND PIERS OVER SPILLWAY	Steel channels - long members in good condition. Little rust. Paint-fair condition, some deterioration. Piers-eroded and undermined at water surface. Wood nailer, deck and railings - badly weathered, 2 deck planks missing. Surface laitance of concrete above waterline eroded. Steel bearing stiffeners and anchor bolts in good condition.	

GATED SPILLWAY - NONE

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL		
APPROACH CHANNEL		
DISCHARGE CHANNEL		
BRIDGE AND PIERS		
GATES AND OPERATION EQUIPMENT		

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed	
OBSERVATION WELLS	None observed	
WEIRS	None observed	
PIEZOMETERS	None observed	
OTHER	None observed	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gentle slopes, heavily forested	
SEDIMENTATION	Reservoir filled with sediment to level of upstream edge of crest of overflow spillway weir but water depth appears to be deeper farther upstream	Sedimentation of reservoir does not appear to be a problem.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Boulders cover bottom. Some brush in channel. Trees overhanging channel.	Brush and trees should be cleared 25 feet on both sides of channel for a distance of 100 feet downstream from the dam.
SLOPES	Slopes are gentle and covered with trees immediately downstream of dam	
APPROXIMATE NO. OF HOMES AND POPULATION	3 homes possibly affected. Estimated population, 10-15 people.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	None disclosed.
REGIONAL VICINITY MAP	Prepared for this report.
CONSTRUCTION HISTORY	None disclosed.
TYPICAL SECTIONS OF DAM	None
HYDROLOGIC/HYDRAULIC DATA	None
OUTLETS - PLAN	None
- DETAILS	None disclosed.
- CONSTRAINTS	None disclosed.
- DISCHARGE RATINGS	None disclosed.
RAINFALL/RESERVOIR RECORDS	None disclosed.

REMARKS

ITEM

None disclosed.

DESIGN REPORTS

None disclosed.

GEOLOGY REPORTS

None disclosed.

DESIGN COMPUTATIONS
HYDROLOGY & HYDRAULICS
DAM STABILITY
SEEPAGE STUDIES

None disclosed.

MATERIALS INVESTIGATIONS
BORING RECORDS
LABORATORY
FIELD

None disclosed.

POST-CONSTRUCTION SURVEYS OF DAM

Unknown

BORROW SOURCES

ITEM	REMARKS
MONITORING SERVICES	None
MODIFICATIONS	Foot bridge added in 1939.
HIGH POOL RECORDS	None
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	None

ITE

REMARKS

SPILLWAY PLAN

SECTIONS

Prepared for this report from field inspection data.

DETAILS

None

OPERATING EQUIPMENT

None

PLANS & DETAILS

None

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 2.9 square miles, wooded, hilly
ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 555.0 MSL (235 ac-ft)
ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 551.6 MSL (287 ac-ft)
ELEVATION MAXIMUM DESIGN POOL: 555.0 MSL
ELEVATION TOP DAM: low pt. 551.6 MSL, abutment 551.9 MSL
CREST: free overflow concrete capped spillway

- a. Elevation 550.0 MSL
- b. Type concrete weir
- c. Width 10' +
- d. Length 70' effective
- e. Location Spillover approximate center of dam
- f. Number and Type of Gates unknown

OUTLET WORKS: low-level outlet pipe
a. Type 20-inch diameter steel pipe
b. Location approximately 12 feet left of the spillway
c. Entrance Invert unknown
d. Exit Invert 544.8 MSL
e. Emergency Draindown Facilities none

HYDROMETEOROLOGICAL GAGES: none
a. Type _____
b. Location _____
c. Records _____

MAXIMUM NON-DAMAGING DISCHARGE: 497 CFS

APPENDIX 2

PHOTOGRAPHS

DIXONS POND DAM



15 MAY 1979

VIEW OF CREST FROM LEFT ABUTMENT LOOKING SOUTHWEST



15 MAY 1979

SPILLWAY LOOKING SOUTHWEST TOWARD RIGHT
ABUTMENT, WITH LOW LEVEL OUTLET PIPE

DIXONS POND DAM



15 MAY 1979

DOWNSTREAM FACE OF LEFT SIDE OF
DAM WITH LOW-LEVEL OUTLET PIPE



15 MAY 1979

LOW-LEVEL OUTLET PIPE

DIXONS POND DAM



15 MAY 1979

BULGE AND DISPLACED BLOCKS ON DOWNSTREAM FACE
BETWEEN LOW-LEVEL OUTLET AND LEFT DAM ABUTMENT



15 MAY 1979

SPILLWAY AND SERVICE BRIDGE WITH
DERELICT BOAT, LOOKING UPSTREAM

DIXONS POND DAM



15 MAY 1979

OVERVIEW FROM UPSTREAM NORTHEAST SHORE LOOKING DOWNSTREAM



15 MAY 1979

SEEPAGE AT TOE BETWEEN SPILLWAY AND LEFT ABUTMENT

DIXONS POND DAM



15 MAY 1979

VIEW DOWNSTREAM FROM SERVICE BRIDGE



15 MAY 1979

VIEW DOWN ON SPILLWAY FACE FROM SERVICE
BRIDGE TOWARD RIGHT ABUTMENT. NOTE DEBRIS.

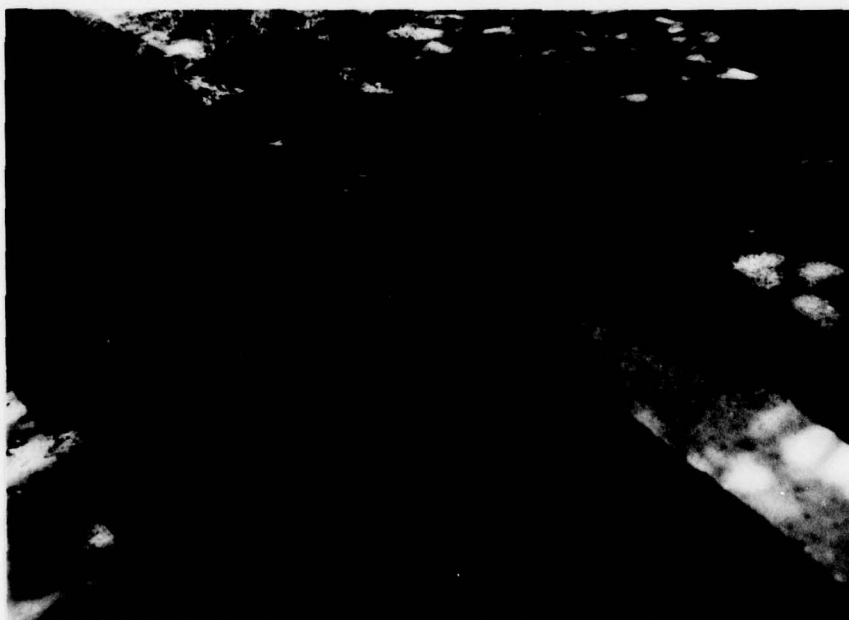
DIXONS POND DAM

2-5



15 MAY 1979

RIGHT ABUTMENT OF SERVICE BRIDGE



15 MAY 1979

RETAINING WALL ON UPSTREAM SIDE OF
EMBANKMENT LEADING TO RIGHT OF SPILLWAY

DIXONS POND DAM



15 MAY 1979

ACCESS ROAD LEADING TO RIGHT ABUTMENT



15 MAY 1979

VIEW OF POND FROM SERVICE BRIDGE LOOKING UPSTREAM

DIXONS POND DAM



15 MAY 1979

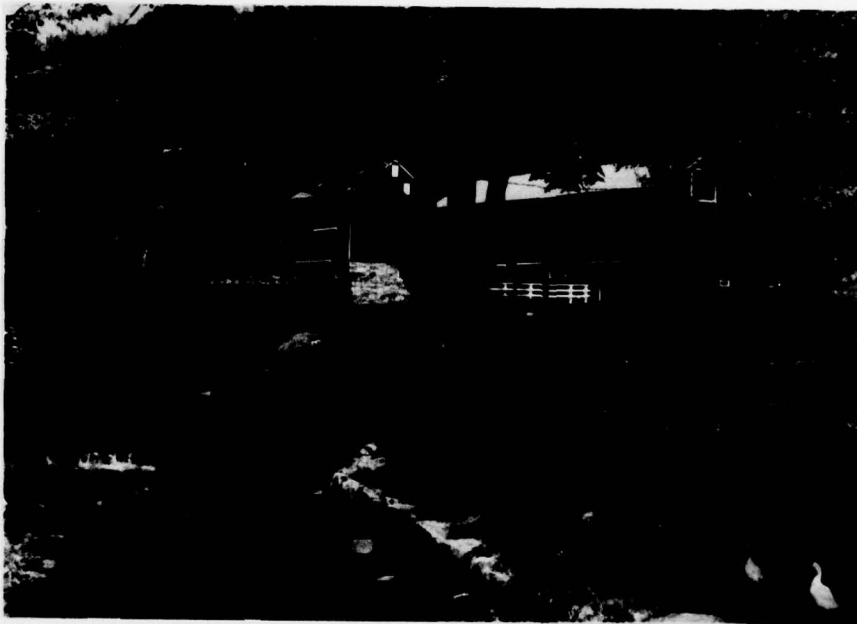
DAM 700 FEET DOWNSTREAM OF DIXONS POND DAM



15 MAY 1979

RESIDENCE ADJACENT TO OUTLET STREAM OF DIXONS POND DAM

DIXONS POND DAM



15 MAY 1979

DAM AND ADJACENT STRUCTURES 1200 FEET
DOWNSTREAM OF DIXONS POND DAM

DIXONS POND DAM

APPENDIX 3

HYDROLOGIC COMPUTATIONS

DIXONS POND DAM

Anderson-Nichols & Company, Inc.

Subject DIXONS POND DAM

Sheet No. 1 of 1A
Date 6/11/79
Computed EFB
Checked EFB

JOB NO. 2290-02

SQUARES
1/4 IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

HYDROLOGIC COMPUTATIONS

NAME: DIXONS POND DAM

LOCATION: MORRIS COUNTY, NJ

DRAINAGE AREA: 2.9 SQ. MILES

SURFACE AREA (NORMAL POOL): 29.4 ACRES

EVALUATION CRITERIA: SIZE: SMALL
HAZARD: HIGH

SPILLWAY DESIGN FLOOD: BASED ON SIZE AND
HAZARD CLASSIFICATION, THE SPILLWAY
DESIGN FLOOD WILL BE THE 1/2 PMF (ONE
HALF THE PROBABLE MAXIMUM FLOOD)

JOB NO. 3290-08SQUARES
1/4 IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

DETERMINE TIME OF CONCENTRATION① TAKE OVERLAND FLOW FROM FARTHEST POINT TO
UNNAMED STREAM

1300' long with head of 90'

② BY KIRPICH NOMOGRAPH $T_c = 5.5$ mins

③ BY IZZARDS FORMULA

$$T_c = \frac{L^{1.115}}{(7700)(H^{.38})} = \frac{1300^{1.115}}{(7700)(90^{.38})} = .070 \text{ hrs} = 4.2 \text{ mins}$$

where $L = \text{length (ft)}$ $H = \text{head (ft)}$

④ BY CALIFORNIA CULVERT EQUATION

P. 71 DESIGN OF SMALL DAMS

$$T_c = \left(\frac{11.9 L^3}{H} \right)^{.385} = \left[\frac{(11.9)(1.246^3)}{90} \right]^{.385} = .090 \text{ hrs} = 5.4 \text{ mins}$$

where $L = \text{length (mi.)}$ $H = \text{head (ft)}$

⑤ BY WESTON FORMULA

(velocity derived from TEXAS HIGHWAY TABLE p. 70 DESIGN OF ST.)

$$T_c = \frac{L}{3600 v} = \frac{1300}{(3600)(2.5)} = 8.6 \text{ mins}$$

where $L = \text{length (ft)}$ $v = \text{velocity (ft/sec)}$ AVERAGE $T_c = 6$ mins

JOB NO. 3290-08SQUARES
1/4 IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

② REACH 1

Length 8700
head 240④ KIRPICH NOMOGRAPH $T_c = 34.5$ mins

⑤ IZZARDS FORMULA

$$T_c = \frac{L^{1.115}}{(1700)(LH^{.38})} = \frac{8700^{1.115}}{(1700)(240^{.38})} = .40 \text{ hrs} = 24 \text{ min.}$$

⑥ BY CALIFORNIA CULVERT EQUATION

$$T_c = \left(\frac{11.9 L^3}{H} \right)^{.385} = \left[\frac{(11.9)(1.65)^3}{240} \right]^{.385} = .56 \text{ hrs} = 33.7 \text{ mins}$$

⑦ BY WESTON FORMULA

Velocity derived from U.S. NAVY TABLE P. 70 DESIGN OF SM. DAMS

$$T_c = \frac{L}{3600V} = \frac{8700}{(3600)(3)} = .80 \text{ hrs} = 48.3 \text{ mins}$$

AVERAGE $T_c = 35$ minsTHIS PAGE IS BEST QUALITY PHOTOGRAPH
FROM SURVEY REPRODUCED TO 100%

JOB NO. 3290-08T_C
 SQUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
 1/4 IN. SCALE

- ③ REACH 2
 INCLUDES LENGTH OF POND
 $L = 5850'$
 $H = 20'$

④ BY KIRPICH NOMOGRAPH $T_C = 56$ mins

B. BY IZZARDS FORMULA

WHERE L = LENGTH (FT), H = HEAD (FT)

$$T_C = \frac{L^{1.115}}{(1700 \times H^{.38})} = \frac{5850^{1.115}}{(1700 \times 20^{.38})} = .66 \text{ HRS.} = 39.6 \text{ mins}$$

⑤ CALIFORNIA CULVERT EQUATION

$$T_C = \left[\frac{11.9 L^3}{H} \right]^{.385} = \left[\frac{(11.9)(5850^3)}{20} \right]^{.385} = .92 \text{ hrs} = 55.2 \text{ mins}$$

WHERE L = LENGTH (MI), H = HEAD (FT)

⑥ BY WESTON FORMULA

(velocity derived from TEXAS HIGHWAY TABLE P. 70 DESIGN SM. DAM.
 L = LENGTH (FT))

$$T_C = \frac{L}{3600V} = \frac{5850}{(3600 \times 3)} = .521 \text{ hrs} = 32.4 \text{ mins}$$

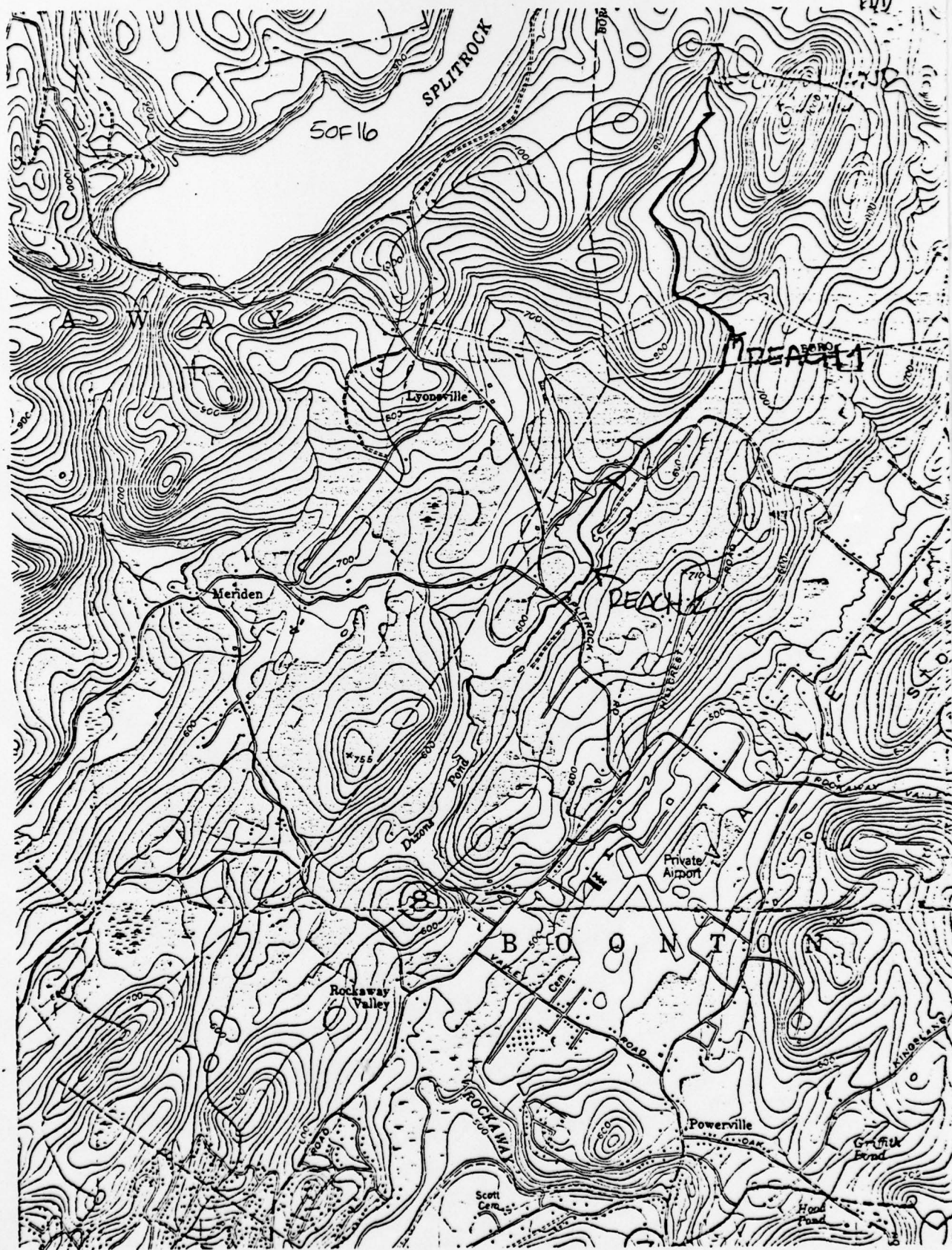
$$\text{AVERAGE } T_C = (56 + 39.6 + 55.2 + 32.4) \div 4 = 45.8 \text{ mins}$$

$$\text{TOTAL } T_C = 45.8 + 35 = 80.8$$

$$\text{LAG} = (T_C)(L.V) = (80.8)(.6) = 48.5 \text{ mins} = .81 \text{ hrs}$$

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5 OF 1A
61170
40
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JOB NO. 3290-03SQUARES
1/4 IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

DEVELOPMENT OF RATING CURVE

① SPILLWAY CURVE

- A. COMPUTE Q USING WEIR FLOW EQUATION ($Q = CLH^{3/2}$)
TO BEAM, THEN PRESSURE FLOW ($Q = CA\sqrt{2gH}$)
TO DECK, THEN WEIR FLOW EQUATION AGAIN
B. TOOK C FROM "HANDBOOK OF HYDRAULICS" KING & BRATER
C. EFFECTIVE LENGTH SPILLWAY = 70 FT
D. COEFFICIENTS; WEIR: 3.4

ORIFICE: .66

E. AREA UNDER BRIDGE = 143.5

F. H = HEAD (FT)

② TOP DAM CURVE

- A. COMPUTE Q USING WEIR FLOW EQUATION
($Q = CLH^{3/2}$)
B. COEFFICIENT = 2.8

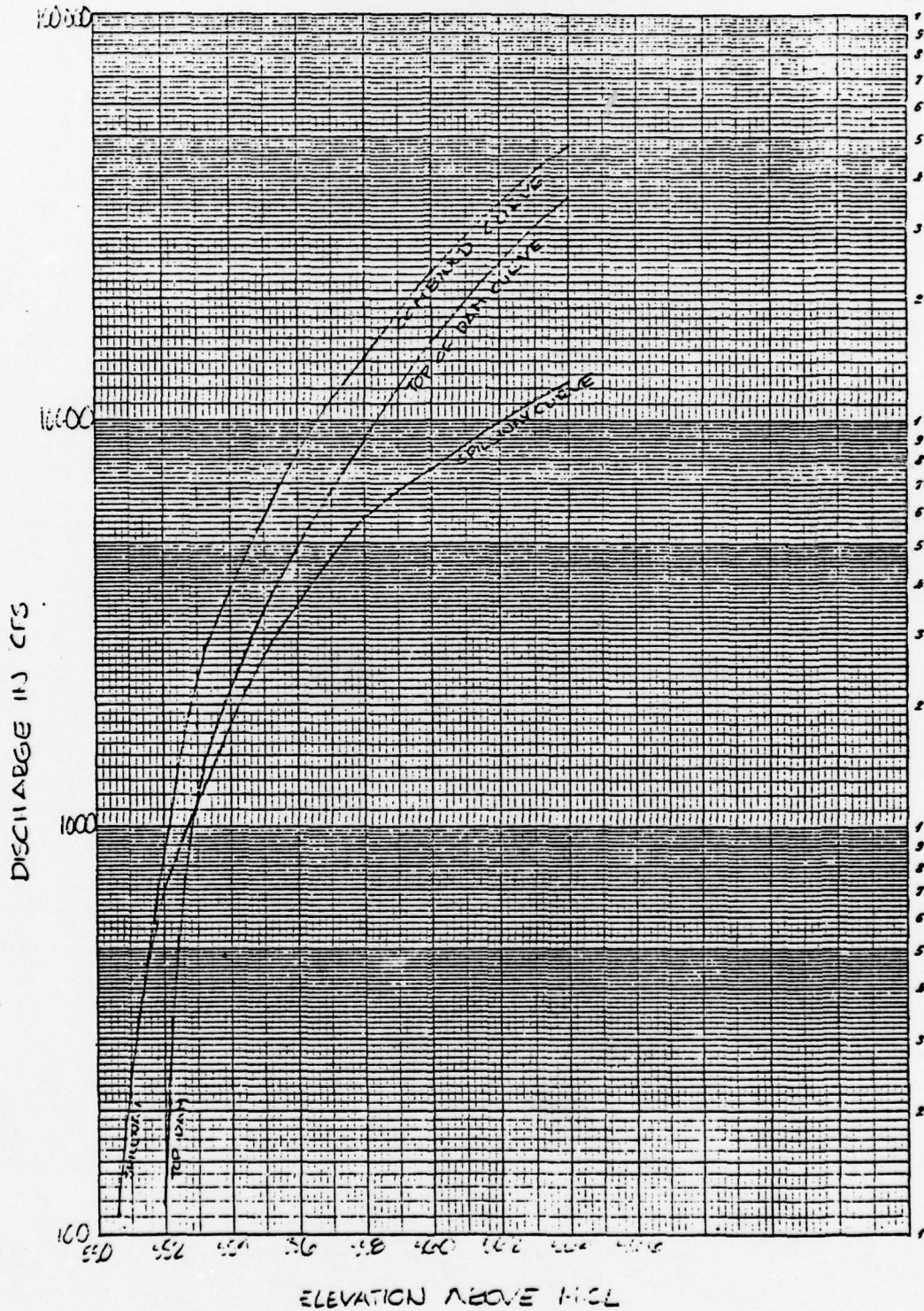
ELEVATION FT.	SPILLWAY		TOP DAM			COMBINED Q CFS
	HEAD FT.	Q CFS	HEAD FT.	LENGTH FT.	Q CFS	
550	0	0				0
551.55	1.55	459	0	142	0	459
551.75	1.75	551	.2	142	36	587
552	2.0	673	.45	142	120	793
552.2	2.2	777	.65	142	208	985
552.6	2.6	899	1.05	152	458	1357
553	3.0	1020	1.45	154	753	1773
553.2	3.2	1302	2.15	156	1377	2739
555	5.0	2661	3.45	170	3050	5711
555.35	5.35	2945	3.8	174	3609	6554
555.5	5.5	3070	3.95	176	3869	6939
556	6.0	3498	4.45	182	4784	8282
558	8.0	5385	6.45	193	8852	14237
560	10.0	7576	8.45	228	15671	23207
562	12.0	9974	10.45	258	24404	34298
564	14.0	12467	12.45	288	35425	47892
566	16.0	15232	14.45	318	48909	64141

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DIXONS FOND DAM
COMBINED PATING CURVE
3290-03

7 OF 14
KATE
6/11/79
FDD

NO. 3118-R, 20 DIVISIONS PER INCH (120 DIVISIONS) BY 2 1/2-INCH CYCLES RATIO RULING. IN STOCK DIRECT FROM CODES BRICK CO., NEWWOOD, MASS. 02062
GRAPH PAPER
PRINTED IN U.S.A.



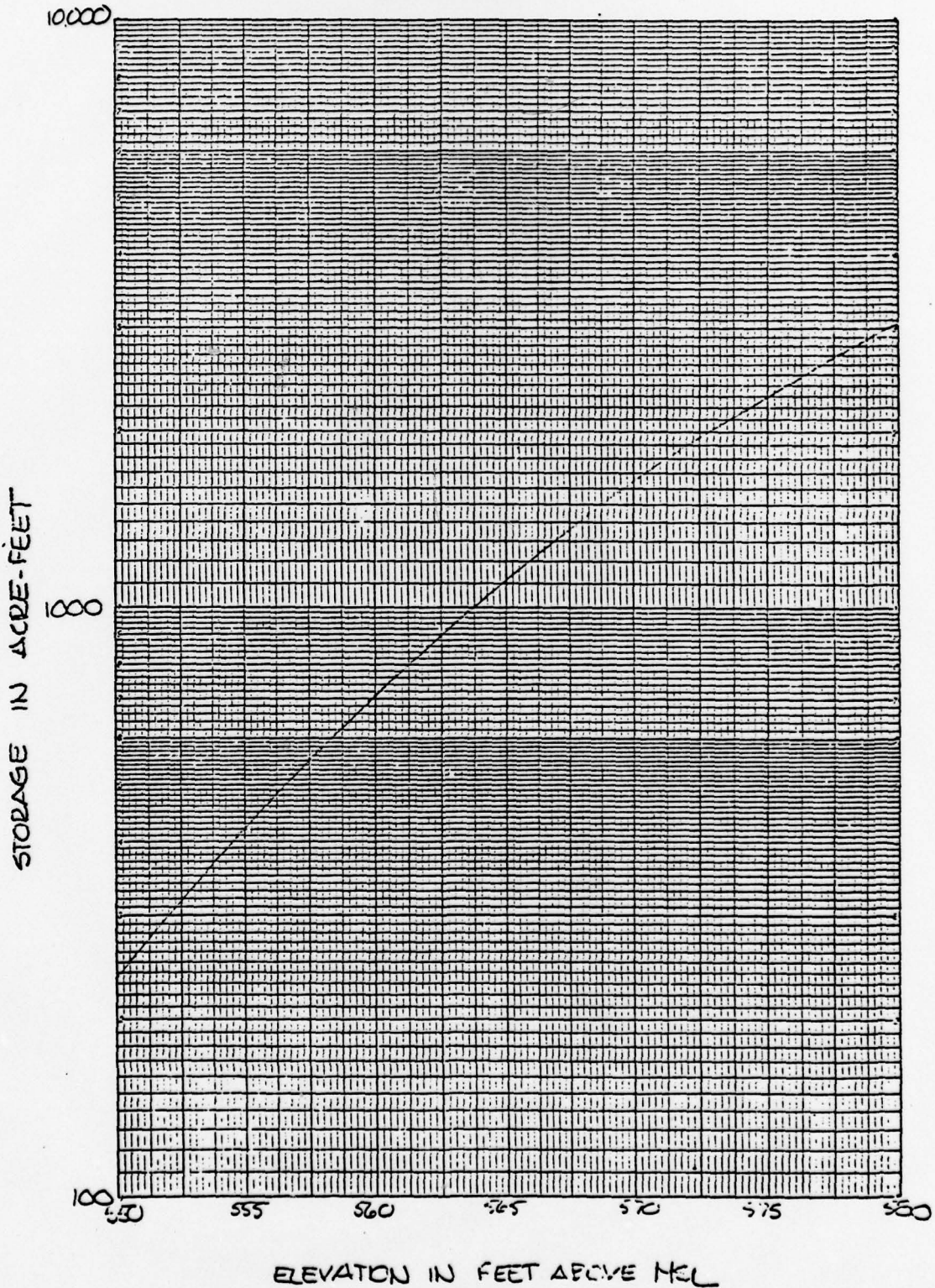
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Anderson-Nichols & Company, Inc.

JOB NO. 3290-08

DIXONS FOND DAM
STORAGE ELEVATION CURVE
3290-05

Sheet No. 9 of 14
Date 12/17/79
Computed KATE
Checked FUD



Anderson-Nichols & Company, Inc.

Subject DIXONS POND DAM

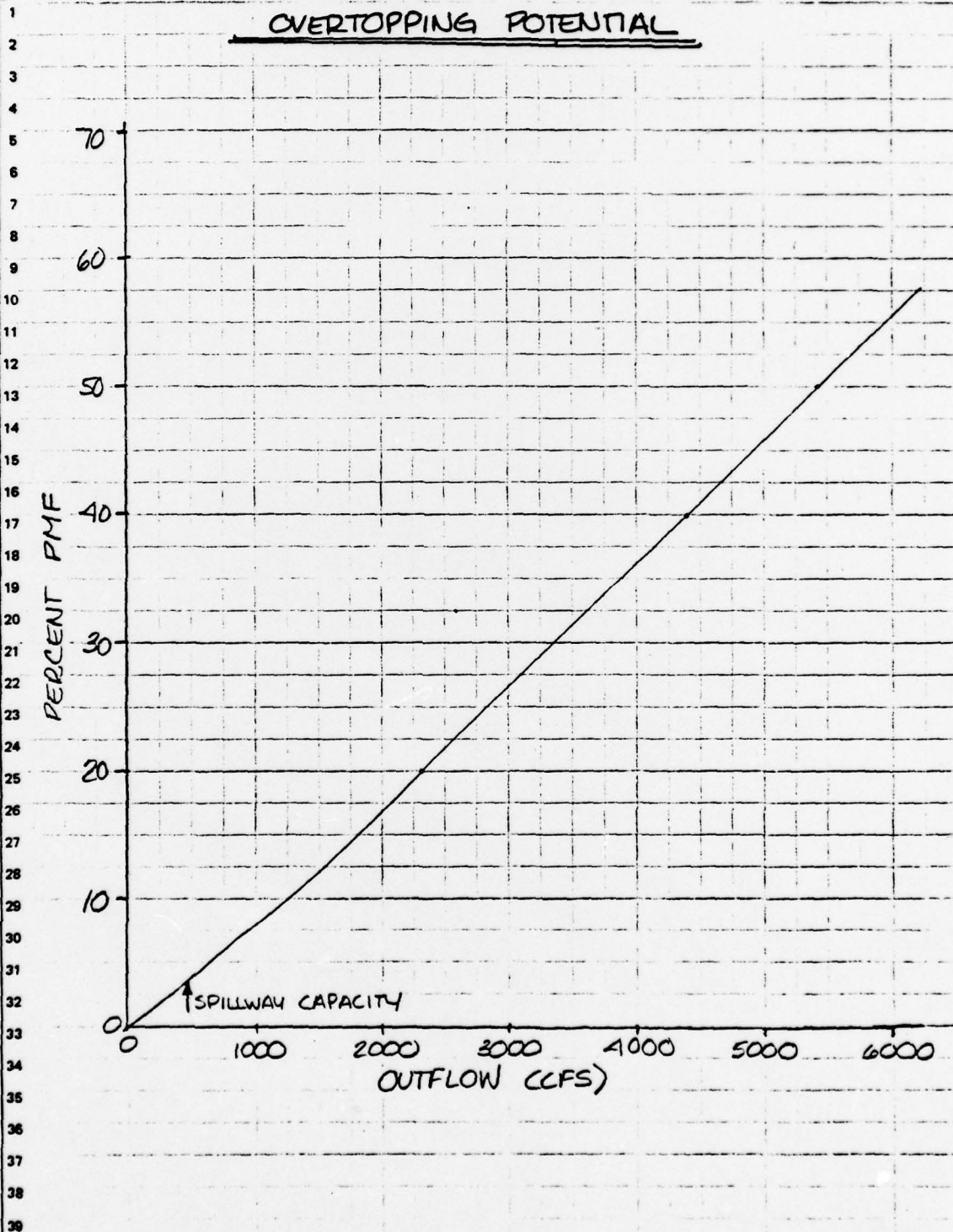
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Date 6-1-51
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JOB NO. 3290-03

SQUARES
1/4 IN. SCALE

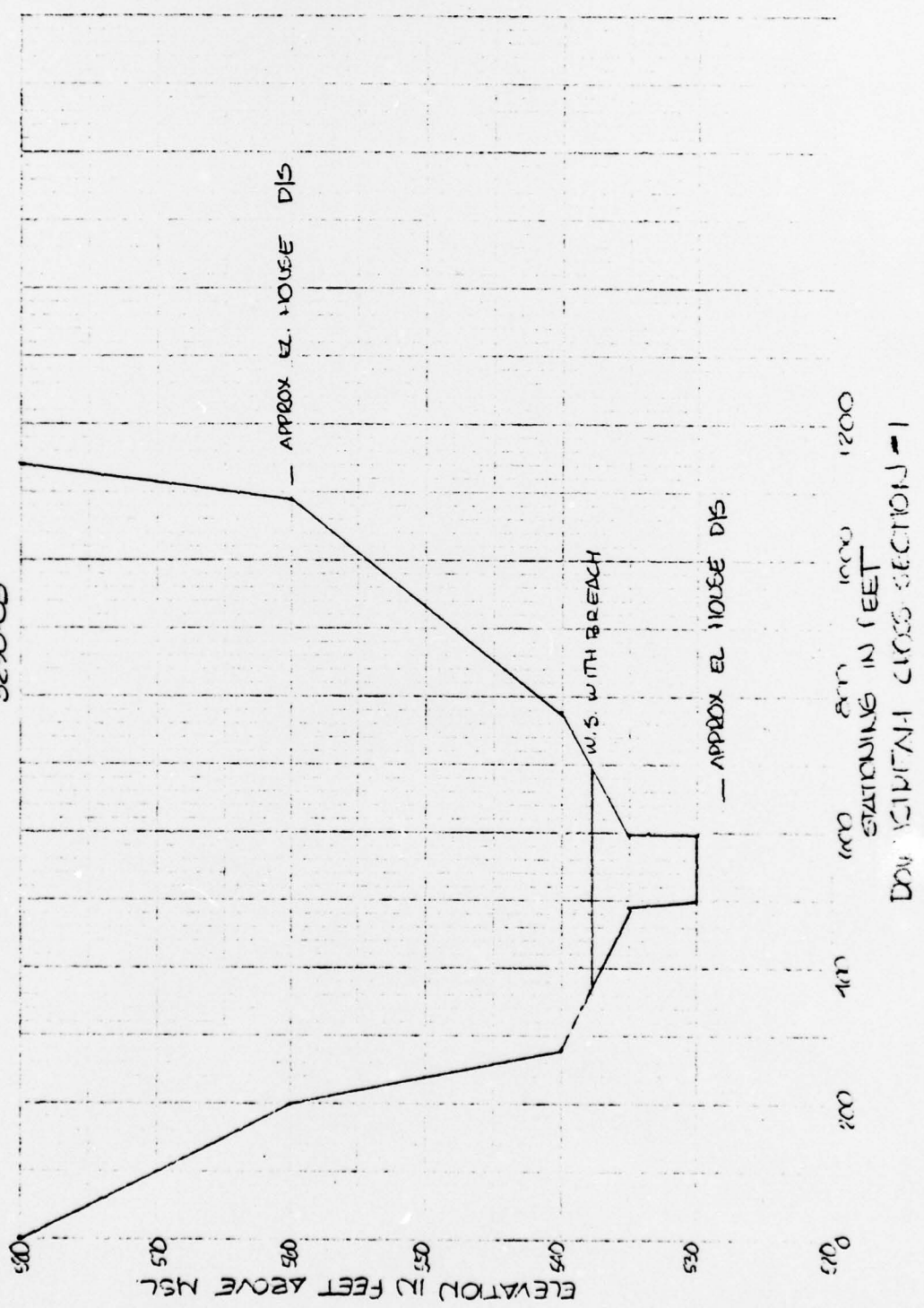
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

OVERTOPPING POTENTIAL



11 OF 14
7.3.79
KATE

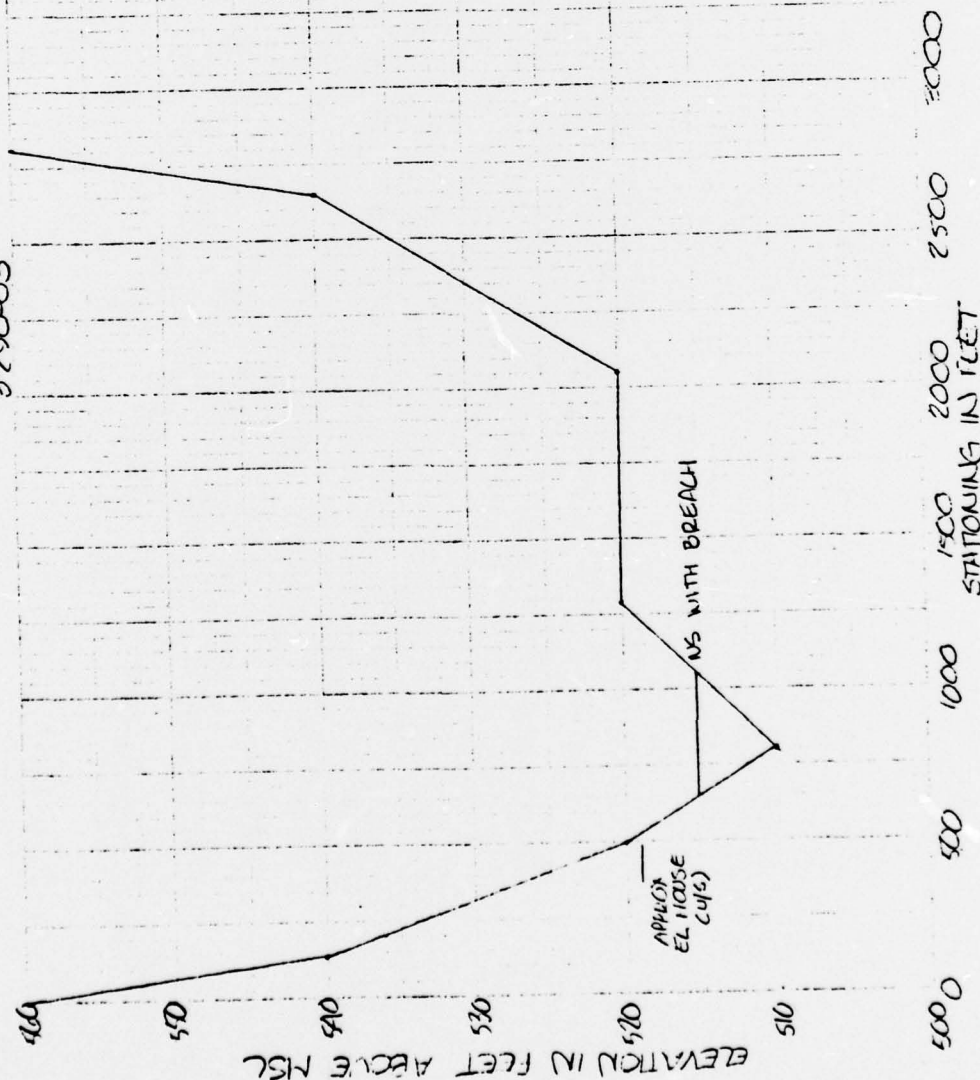
DIXONS POND DAM
3290-03



CONSTRUCTION OF DAM AND APPROXIMATE HOUSE WITH INTERIOR OF DAM. 11 OF 14
7.3.79
KATE

12 OF 14
6/11/79
KATE
FDD

DIXONS POND DAM
3790-03



DIXONS POND DAM SECTION NO. 2

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JOB NO. 3290-03
 SQUARES
 1/4 IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

DETERMINATION OF "C" FOR BLOW-OFF PIPE

$$C_p = A_p \sqrt{\frac{2g}{1 + K_i + K_e L_p}}$$

FROM S&W CONSTRUCTION ENGINEERING p. 641

TAKE $N = .017$ (p. 632 TABLE G-1)

$$K_e = \frac{5087 n^2}{D^{4/3}} = \frac{(5087)(.017)^2}{20^{4/3}} = .030$$

$$C_p = A_p \sqrt{\frac{64.4}{1 + K_i + K_e L_p}}$$

 WHERE K_i = ENTRANCE LOSS = .8
 (p. 639)
 L = LENGTH = 29.7'

$$= 2.18 \sqrt{\frac{64.4}{1 + .8 + (.03)(29.7)}}$$

$$= 2.18 \sqrt{23.9}$$

$$= 10.66$$

$$\therefore C = .61$$

JOB NO. 3290-03SQUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 3
1/4 IN. SCALEDRAWDOWN CALCULATIONSCALCULATIONS ASSUME ① NO SIGNIFICANT INFLOW
② LOW LEVEL OUTLET TO BE OPERABLE

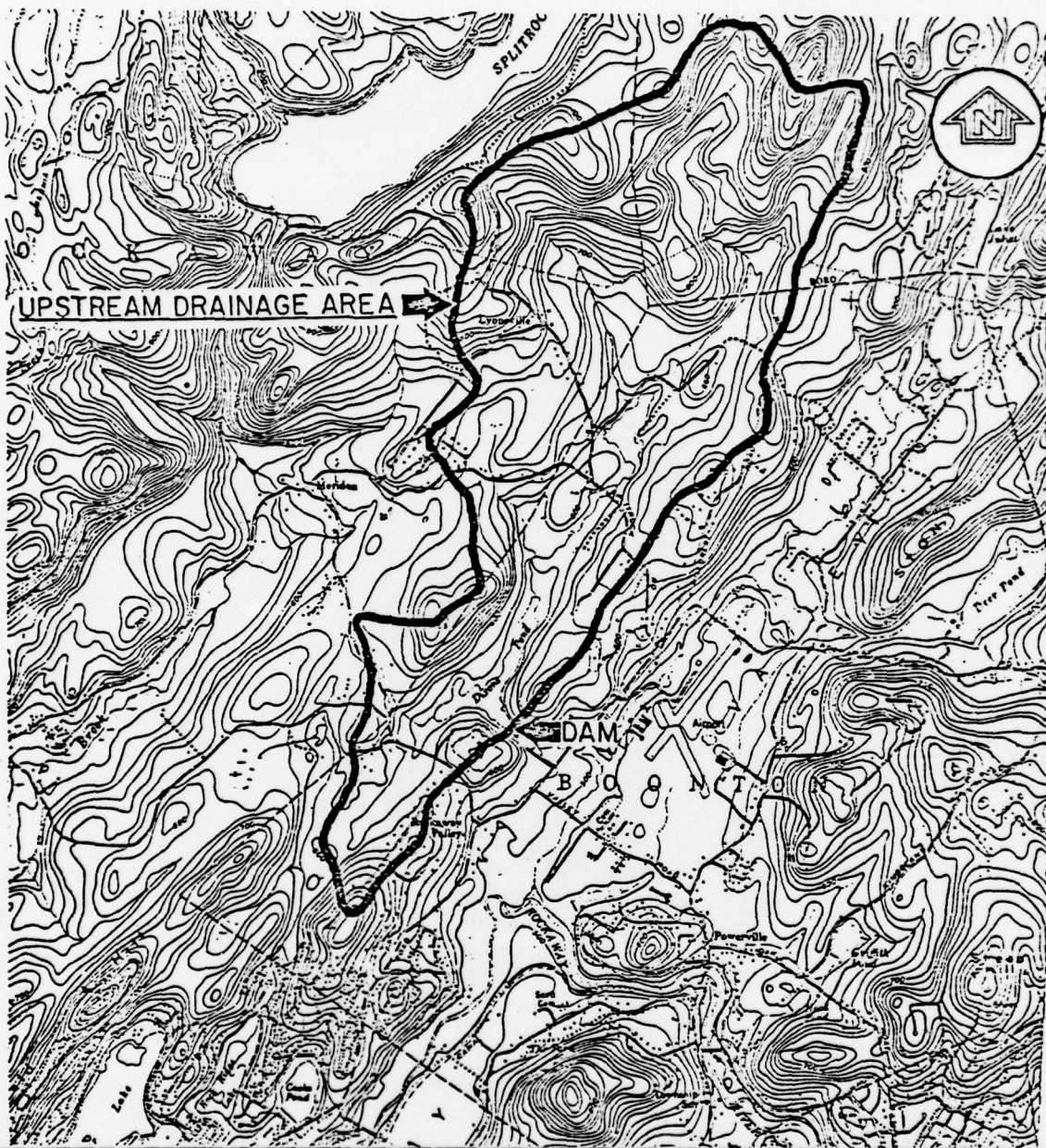
ELEV. FT	STORAGE AC-FT	Δ STORAGE AC-FT	H FT	Q CFS	AVG Q CFS	AC-FT DAY	DAYS*
550	235		5.2	24			
		15			23.5	46.6	.32
549.5	220		4.7	23			
		15			22.5	44.6	.34
549	205		4.2	22			
		15			21.5	42.6	.35
548.5	190		3.7	21			
		15			20	40	.45
548	172		3.2	19			
		19			18.5	37	.51
547.5	153		2.7	18			
		20			17	34	.59
547	133		2.2	16			
		21			15	30	.70
546.5	112		1.7	14			
		28			13	26	1.1
546	84		1.2	12			
		28			10.5	21	1.3
545.5	56		.7	9			
		22			7	14	3.1
545	34		.2	5			
		34			2.5	5	6.8
544.8	0		0	0			15.56

$$Q_p = C_p H^{1/2} = 10.66 (H^{1/2}) \text{ SEE PREVIOUS PAGE}$$

$$* \text{NOTE: } AC\text{-FT/DAY} = 1.9835 \times \text{AVG. Q}$$

$$\text{DAYS} = \Delta S / AC\text{-FT/DAY}$$

TOTAL = 15.56 DAYS



NATIONAL PROGRAM OF INSPECTION OF
NON-FED. DAMS

DIXONS POND DAM
BOONTON TOWNSHIP, NEW JERSEY

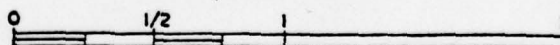
REGIONAL VICINITY MAP

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA

ANDERSON-NICHOLS & CO., INC.

BOSTON, MA

SCALE IN MILES



MAP BASED ON U.S.G.S. 7.5 MINUTE QUADRANGLE
SHEET. BOONTON, N.J., 1954, UPDATED 1970.

HEC-1 OUTPUT
OVERTOPPING ANALYSIS
DIXONS POND DAM

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THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .001 HOURS DURING BREACH FORMATION.
 DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .167 HOURS.
 THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPILED BREACH HYDROGRAPH.
 INTERPRETIVE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	COMPUTED BREACH HYDROGRAPH (CFS)	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (MG-FT)
16.333	1.760	5999	5999	0	0	0
16.354	.021	5953	5771	-182	-182	-1
16.375	.042	5907	5671	-236	-418	-2
16.396	.063	5862	5610	-252	-670	-3
16.417	.084	5816	5548	-268	-938	-4
16.438	.104	5770	5486	-284	-1222	-5
16.459	.125	5725	5424	-301	-1523	-6
16.479	.146	5680	5362	-318	-1841	-7
16.500	.167	5634	5300	-334	-2175	-8
16.521	.188	5589	5238	-351	-2526	-9
16.542	.209	5543	5176	-367	-2893	-10
16.563	.229	5498	5114	-384	-3277	-11
16.584	.250	5452	5052	-400	-3677	-12
16.605	.271	5407	4990	-417	-4094	-13
16.626	.292	5361	4928	-433	-4527	-14
16.646	.313	5316	4866	-450	-4977	-15
16.667	.333	5270	4804	-466	-5443	-16
16.688	.354	5225	4742	-483	-5926	-17
16.709	.375	5179	4680	-499	-6425	-18
16.729	.396	5134	4618	-516	-6941	-19
16.750	.417	5088	4556	-532	-7473	-20
16.771	.438	5043	4494	-549	-8022	-21
16.792	.458	4997	4432	-565	-8587	-22
16.813	.479	4952	4370	-582	-9169	-23
16.833	.500	4906	4308	-598	-9767	-24
16.854	.521	4861	4246	-615	-10382	-25
16.875	.542	4816	4184	-632	-11014	-26
16.896	.563	4770	4122	-648	-11662	-27
16.917	.583	4725	4060	-665	-12327	-28
16.938	.604	4680	4000	-680	-13007	-29
16.958	.625	4634	3938	-696	-13703	-30
16.979	.646	4589	3876	-713	-14416	-31
17.000	.667	4543	3814	-729	-15145	-32
17.021	.688	4498	3752	-746	-15891	-33
17.042	.709	4452	3690	-762	-16653	-34
17.063	.729	4407	3628	-779	-17432	-35
17.083	.750	4361	3566	-795	-18227	-36
17.104	.771	4316	3504	-812	-19039	-37
17.125	.792	4270	3442	-828	-19867	-38
17.146	.813	4225	3380	-845	-20712	-39
17.167	.833	4179	3318	-861	-21573	-40
17.188	.854	4134	3256	-878	-22451	-41
17.209	.875	4088	3194	-894	-23345	-42
17.229	.896	4043	3132	-910	-24255	-43
17.250	.917	3997	3070	-926	-25181	-44
17.271	.938	3952	3008	-943	-26124	-45
17.292	.958	3906	2946	-960	-27084	-46
17.313	.979	3861	2884	-977	-28061	-47
17.333	1.000	3816	2822	-993	-29054	-48

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STATION 42

TIME (UNST)	401 INTERPOLATED BREACH HYDROGRAPH (01 COMPUTED PEAK) HYDROGRAPH	5000.	5200.	5400.	5600.	5800.	6000.	6200.	6400.	6600.	6800.	0.	0.	0.	0.
16.00.00															
16.01.00															
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HYDROGRAPH ROUTING														
CHANNEL ROUTING - WED PULS - CHANNEL REACH 1														
IST20	ICOMP	IECON	ITAPE	JFLT	JPR1	INAME	ISTAGE	IAUTO						
0	1	0	1	0	1	1	0	0						
ROUTING DATA														
CLASS	AVG	IPFS	ISAME	IPPT	IPPP	LSTR								
0.0	0.000	0.00	10	0	0	0								
MSIPS NSTOL LAG AMSKX X TSK STORA ISPRAT														
1	0	0	0.000	0.000	0.000	0								
NORMAL DEPTH CHANNEL ROUTING														
CH(1)	CH(2)	CH(3)	ELHVT	FLMAX	RLNTH	SFL								
0.00	0.000	0.000	530.0	540.0	540.0	0.0340								
CROSS SECTION COORDINATES--STA.ELEV.ASTA.ELEV--ETC														
0.00	540.00	60.00	540.00	270.00	535.00	240.00	530.00	380.00	530.00					
390.00	535.00	560.00	540.00	715.00	550.00									
STORAGE														
0.00	1.44	2.97	4.55	6.18	7.91	10.48	14.19	19.03	25.02					
32.05	39.50	47.27	55.37	63.79	72.53	81.60	90.98	100.69	110.73					
OUTFLOW														
0.00	751.20	2396.13	4734.53	7691.27	11295.84	15922.40	21814.42	29292.63	38620.24					
30312.52	64944.58	81392.52	99815.34	120192.25	142515.16	166784.57	193007.04	221193.53	251358.25					
STAGE														
0.00	531.05	532.11	533.16	534.21	535.26	536.32	537.37	538.42	539.47					
540.53	541.58	542.63	543.68	544.74	545.79	546.84	547.89	548.95	550.00					
FLOW														
0.00	751.20	2396.13	4734.53	7691.27	11295.84	15922.40	21814.42	29292.63	38620.24					
30312.52	64944.58	81392.52	99815.34	120192.25	142515.16	166784.57	193007.04	221193.53	251358.25					

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HYDROGRAPH ROUTING														
CHANNEL ROUTING -PDD PULS- CHANNEL REACH 2														
ROUTING DATA														
ISTAG	ICOMP	IECON	ITAPF	JPLT	JPR1	INAME	ISTAGE	IAUTO						
AA	1	0	0	1	1	0	0	0						
QLOSS	CLLOSS	AVG	IRCS	ISAPF	IOPT	IFMP	LSTR							
0.0	0.000	0.00	1	1	0	0	0							
MSIPS	MSIOL	LAG	AMSK	X	TSK	STORA	ISPRAT							
1	0	0	0.000	0.000	0.000	0.	0							
NORMAL DEPTH CHANNEL ROUTING														
QIN(1)	QIN(2)	QIN(3)	FLNVT	ELMAX	RLNTH	SEL								
0.000	0.000	0.000	510.0	520.0	740.	0.02700								
CROSS-SECTION COORDINATES==STA=ELEV,STA=ELEV==ETC														
0.00	520.00	80.00	517.00	150.00	515.00	300.00	510.00	540.00	515.00					
640.00	517.00	790.00	520.00	750.10	520.00									
STORAGE	Q	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL
0.00	18.36	22.24	26.53	31.22	36.30	41.74	47.54	53.70	59.97	66.34	72.80	79.37	86.04	92.80
OUTFLOW	Q	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL
0.00	12736.45	27.15	172.38	508.24	1094.55	1984.55	3227.10	4867.85	6899.97	9314.57	11720.29	14145.01	16636.06	19181.51
STAGE	Q	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL
510.00	510.53	511.05	511.58	512.11	512.63	513.16	513.68	514.21	514.74	515.27	515.80	516.33	516.86	517.39
FLOW	Q	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL
12736.45	16636.06	21116.97	26207.66	32649.17	40092.67	48678.51	58499.97	69499.97	81499.97	93499.97	105499.97	117499.97	129499.97	141499.97

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HYDROGRAPH AT	A1	2.90 (7.51)	1	2604.	6200.	12521.
				(705311)	1772773	35945510
ROUTED TC	A2	2.90 (7.51)	1	2857.	6640.	13228.
				(674583)	1884023	3745090
ROUTED TC	A3	2.90 (7.51)	1	2825.	6678.	13231.
				(681963)	1893113	3744530
ROUTED TC	A4	2.90 (7.51)	1	2442.	6710.	13183.
				(671818)	1904030	3737030

PLAN 1	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	550.00	550.00	551.60
STORAGE	235.	235.	237.
OUTFLOW	0.	0.	497.

RATIO OF PWF	MAXIMUM PERFORCING V.S. FLEV	MAXIMUM DEPTH OVER DAM	MAXIMUM AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	55.14	1.54	362	2457	5.23	16.50	0.00
.50	59.70	3.05	405	1661	8.50	16.23	16.23
1.00	55.55	3.95	448	1328	6.00	16.50	15.50

RATIO	FLOW,CFS	STAGE,FT	TIME HOURS
.20	245*	532.1	16.50
.50	667*	533.8	16.67
1.00	1323*	535.7	16.50

	RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
1	.20	2442.	512.8	16.67
2	.50	6710.	519.1	16.67
3	1.00	13103.	515.3	16.50

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APPENDIX 4

REFERENCES

DIXONS POND DAM

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APPENDIX 4

REFERENCES

DIXONS POND DAM

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